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Review

An integrative model of the impairments in insight in schizophrenia: emerging research on causal factors and treatments

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Abstract

Introduction: Poor insight, or unawareness of some major aspect of mental illness, is a major barrier to wellness when it interferes with persons seeking out treatment or forming their own understanding of the challenges they face. One barrier to addressing impaired insight is the absence of a comprehensive model of how poor insight develops.

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Areas covered: To explore this issue we review how poor insight is the result of multiple phenomena which interfere with the construction of narrative accounts of psychiatric challenges, rather than a single social or biological cause.

Expert Commentary: We propose an integrative model of poor insight in schizophrenia which involves the interaction of symptoms, deficits in neurocognition, social cognition, metacognition, and stigma. Emerging treatments for poor insight including therapies which focus on the development of metacognition are discussed.

Keywords: schizophrenia, insight, symptoms, neurocognition, social cognition, metacognition, stigma

1. Introduction

Many with schizophrenia spectrum disorders are unaware of key aspects of their condition [1, 2] and as a result are at risk for especially poorer outcomes [3, 4]. This unawareness, referred to as poor or impaired insight, has been divided generally into two forms. The first, clinical insight, is a multidimensional construct that includes at least three different domains: awareness of symptoms, need for treatment, and potential consequences of the disorder [1]. The second form of insight, cognitive insight, refers to awareness of alterations in reasoning processes [5]. Lack of cognitive insight in those with schizophrenia can, for example, involve being excessively certain about the accuracy of a belief or being less reflective about one's own thoughts and feelings [6]. Impaired insight is linked to important outcome variables such as treatment non-adherence [7-9], higher rates of re-hospitalization [10], poorer social skills [11], reduced social relationships [12, 13], compromised work performance [14,15], and a longer duration of untreated psychosis [16, 17]. Impaired insight has also been linked to concurrent and prospective assessments of quality of life [18], poorer personal recovery [19], and poor global functioning [20, 21]. In line with this, other investigations have shown that individuals with higher levels of insight are better able to appraise their level of psychosocial functioning [22] and tend to have more self-efficacy when compared to individuals with poorer insight [23]. Importantly, impaired insight has not been found to be explainable merely by demographic factors [24].

Impaired insight has been shown to persist even in individuals whose symptoms have remitted [25] and is found across different cultures [26, 18] and phases of illness [27-30]. In terms of responsiveness to intervention, individuals with impaired insight tend to have negative attitudes toward [31-34], and are less likely to adhere to [35], treatment. With medication, for instance, poor adherence is mediated by patients' perceptions of medication necessity [36]. With regard to psychosocial interventions, impaired insight predicts poorer therapeutic alliance [37], even for manualized psychotherapy [38].

To date, efforts to promote insight have been fraught with many complications. Efforts to engage individuals with schizophrenia and poor insight in treatment may indeed be experienced as intrusive or overwhelming to those individuals rather than as benevolent or helpful. Moreover, such efforts are potentially inconsistent with contemporary models of recovery from mental illness that argue that individuals facing psychiatric challenges need to feel empowered, hopeful,

and in charge of their own recovery [39]. It may be that direct attempts to help individuals accept that they suffer from a mental illness may have the iatrogenic effect of making those individuals feel incompetent and lead them to give up trying to make their own sense of their challenges, accepting that that can only be done by more powerful others.

We suggest that the primary barrier to developing methods to address insight which are consistent with a recovery-oriented approach is a lack of a coherent multidimensional model of how poor insight develops and persists. To address this issue, the present review will examine recent literature on the correlates and consequences of impaired insight. Specifically, we will discuss processes that contribute to impaired insight and then examine innovative therapeutic approaches and future directions to improving insight in schizophrenia. Of note, while the literature had previously tended to debate whether poor insight is a reflection of biological vs. psychosocial forces (e.g. anosognosia versus denial as defense mechanism), we will avoid any such simplification and approach poor insight as a multi-determined phenomenon. Literature reviewed was found through a search of PubMed and SCOPUS including the search terms insight, awareness of illness, self-reflection, psychosis, and schizophrenia.

2. Poor Insight in Schizophrenia as a Disturbance in Reflectivity

Considered as a whole it is important to establish that conceptually, impaired insight is not simply the failure to grasp a specific fact or agree with a certain label. It is not a lack of particular form of knowledge (e.g. about mental illness) or a global unawareness of the world as can be the case with dementia. Poor insight can persist in the midst of other intact forms of awareness. For instance, an individual with schizophrenia may deny that hearing voices is a symptom of his/her own mental illness and yet recognize that if someone else is hearing voices it is indeed part of their mental illness [40]. In addition, individuals with impaired insight may respond in an adaptive manner to other life demands or meaningfully appraise other aspects of their health [41].

Poor insight is instead a failure to make adaptive meaning of psychiatric challenges [2]. Insight is a phenomenon involving not only the acceptance of the facts associated with one's illness, but also the integration of a range of experiences into complex understanding of one's psychiatric challenges. Individuals with poor insight have ultimately failed to some degree to construct an integrated account of the deeply complex events which marked the emergence and

possibly the persistence of mental illness in their lives. Poor insight refers to a state in which persons have not developed a consensually valid narrative of their psychiatric challenges which would allow for those events to be understood and responded to adaptively [42]. As an illustration, poor insight may describe a failure to see how the loss of a job and a romantic relationship, coupled with the emergence of intense fear, anxiety, and paranoid beliefs over a period of months may have signaled the appearance of a psychiatric condition.

In this sense, poor insight is in part a failure of self-reflection or the capacity for reflectivity. Reflectivity in this sense refers to the process by which persons synthesize and comprehend ideas about themselves. We suggest that a key implication of this conceptualization is that an adequate model of impaired insight must include a description of the factors which account for disturbed reflectivity. To help develop such an account, in what follows we will consider different phenomenon observed in schizophrenia spectrum disorders that could limit persons' abilities to construct narrative accounts of psychiatric challenges. Specifically, we will focus on the potential of different classes of symptoms, deficits in neurocognition, social cognition, metacognition, and social factors such as stigma to contribute to poor insight.

3. Psychiatric Symptoms

One potential set of factors that could disturb the potential for insight are the symptoms of schizophrenia itself. Positive symptoms such as hallucinations and delusions are often disturbing and novel experiences which could be difficult to reflect about and create an understanding of through either one's own reflections or conversations with others. Negative symptoms such as avolition, paucity of thought, and blunted affect similarly represent changes in mental states and could naturally be difficult to explain or think about. In support of these possibilities, poor insight has been linked with heightened positive [43] and negative [44] symptoms. However, it is important to note that these relationships have not been consistently found [45,46].

One factor complicating the study of insight and symptoms is that it is unclear whether symptoms are a barrier to the development of insight or whether poor insight leads to treatment nonadherence which then can result in symptom exacerbation in both first episode and prolonged schizophrenia samples [47, 43, 2, 26, 18]. Mintz [48] performed a meta-analysis on over 40 studies of insight and positive and negative symptom severity and found that while insight and

symptom severity were related, that relationship was only slight, with symptom severity accounting for 7% of the variance in insight. Both age of onset and acuity of disease state served as moderating variables. Similarly, Wang and colleagues [18] found that insight was related to baseline assessments of symptoms, but the relationship was no longer significant at 12-month follow up. In a 12-month longitudinal investigation, individuals whose insight did not improve over the course of the study were found to have particularly recalcitrant negative symptoms relative to those individuals with initially good or improved insight [49]. The authors suggest that impaired insight may contribute to the maintenance of negative symptoms rather than the other way around. By contrast, another recent study found that the association among insight and negative symptoms was no longer statistically significant once disorganization symptoms were accounted for [50].

In terms of cognitive insight, one study examining potential moderators of the association among cognitive insight and positive symptoms suggested that poor insight is more likely to be associated with positive symptoms when individuals with these symptoms also have a naïve self-concept [51]. Other work suggests that individuals with depressive symptoms have better cognitive insight that those without such symptoms [52]. In a study by Quee and colleagues [53], the relationship among insight and symptoms was found to be more complicated and likely moderated by phase of illness. Regression analyses revealed that insight accounted for significant variance in those individuals with multiple episodes of illness, but not in those with recent onset.

One possible parsimonious explanation for these mixed findings is that symptoms may be a partial, albeit small, contributor to the development of insight. In other words, symptoms severity may sometimes affect insight for some persons in some conditions. As noted in Garcia, Guerro & Lysaker [51], for example, perhaps severe symptoms are more of a barrier to insight for persons with less complex ideas about themselves. Simply put, it may be more difficult to make sense of recalcitrant symptoms when persons have poorer capacity for self-reflection [54]. Conversely, individuals with greater capacities to think about their own thinking might be able to both recognize that it is unlikely that they truly possess special powers, as they previous thought, and may be able to further reflect that this belief becomes stronger when they are socially isolated or feeling rejected by others.

4. **Neurocognition and Anomalous Brain Structure and Function**

A second potential barrier to persons engaging in the kinds of reflective activity needed for the development of insight are neurocognitive deficits and anomalous brain functioning. For instance, it is possible that deficits in attention, memory, and executive functioning affect insight when they limit individuals' access to memories of the various events associated with their mental illness. These deficits could further serve as a barrier to awareness of illness when they make it difficult to sort through what memories are available and either place those memories in sequence or determine what are the most salient aspects of those memories. While symptoms might present experiences that are difficult to make sense of, neurocognitive deficits might limit the person's access to and ability to sort through the pieces of information which can be later assembled into a coherent account of psychiatric challenges [55, 56].

In support of this, a meta-analysis of 35 studies suggested a significant but weak relationships between impaired insight and overall neurocognition with a mean weighted correlation coefficient of r = .17 with a 95% confidence interval ranging from .13 to .21 [57]. In another review of 34 studies Shad et al [58] reported that deficits in executive function measured with the Wisconsin Card Sorting Task were the aspect of neurocognitive functioning most frequently linked to insight. Others have found that both executive function and verbal memory are closely linked with insight in schizophrenia [59, 60, 44]. A recent first-episode study found that verbal memory and global cognitive functioning were predictive of impaired insight [61]. A separate study suggested that poor awareness of symptoms and consequences of illness were linked to reduced flexibility to manipulate incoming information [62]. Another study showed that deficits in episodic memory for negative autobiographical events likely play a role in impaired insight in schizophrenia [63]. As in the case of symptoms, a complicating factor is that poor neurocognition could also contribute to treatment non-adherence, creating another feedback loop through which symptoms and insight could be related. Indeed, a recent study found that better executive functioning and better insight were associated with increased medication adherence [64].

Of note, some studies have failed to find a link between neurocognition and insight. Zhou and colleagues [65], for example, examined the relationship between symptoms, insight, and cognition in 74 individuals with prolonged schizophrenia and insight was linked to clinical symptoms but not neuropsychological functioning. While neurocognition seems a promising

factor underlying the development and maintenance of insight in schizophrenia, further research is needed to delineate its exact role.

In terms of brain structure and functioning, imaging studies suggest that areas which subserve impaired insight are also those associated with deficits in neurocognition [66, 67]. Several studies have indeed suggested that a lack of insight in schizophrenia spectrum disorders is related to aberrant structure and function of the frontocortical systems (see [68] for detailed review). Abnormalities related to insight in schizophrenia include reduced total brain volume, ventricular enlargement, frontal lobe atrophy, reduced frontal volume, and gray matter deficits in the cingulate, precuneus, temporal, and parietal lobes [68]. More recent investigations suggest that the complexity of insight as a construct may be reflected in neurobiology, as studies suggest that unawareness of illness and misattribution of symptoms may have independent biological bases in schizophrenia [58], with others reporting alterations in functional connectivity related to self-reflectivity and ultimately insight [69]. Recent studies have compared high and low insight groups amongst individuals with schizophrenia and found particular abnormalities and functioning in low insight groups [70, 71]. Nonetheless, even with the positive findings cited above, caution must be exercised as there have been other studies that call into question such associations due to negative findings [72, 73].

5. Deficits in Social Cognition and Poor Metacognition

A third and fourth set of potential barriers to the development of insight involve processes which are central to reflectivity; specifically persons' abilities to form ideas about themselves and others. The first of these is social cognition [74-76]. Social cognition refers to the affective, automatic, and willful processes, which allow people to grasp other's mental states and the meanings of social interactions. Social cognition includes a number of components such as Theory of Mind (ToM), Affect Recognition, and Attributional Style [53]. The second process which may be related to insight is metacognition [77-80]. Metacognition refers to activities which allow persons to be aware of and form integrated and complex ideas about the self and others. Originally used in the education literature to describe an individual's awareness of learning style [81], the term metacognition has since been expanded to an entire spectrum of mental activities. Metacognitive acts range from discrete processes, such as thinking about a thought, to more synthetic acts that require thoughts, feelings, and intentions to be integrated into

complex representations that later enable individuals to recognize and respond to life challenges [82-86]. While both these constructs are concerned with how persons are aware of each other, one operational difference between the two is that more synthetic forms of metacognition are assessed by analyzing discourse and not by assessing the correctness of a judgment. Theoretically, the assessment of metacognition seeks to capture a kind of understanding which is greater than the sum of its parts. Comparatively, ToM and Affect Recognition call for the correct detection of a discrete thought or feeling of another, while metacognition is interested in the integration of those details into a whole whose coherence is considered, rather than the absolute correctness of a judgment. Metacognition also includes the complex ability to shift back and forth from one's own perspective to the valid and possibly differing perspectives of others [87-90].

Both social cognition and metacognition appear likely to be related to insight for several reasons. The development of insight requires, for instance, more than the acceptance of fact. Insight involves making a personally meaningful sense of how mental illness has and has not interrupted a unique life. Insight, for example, requires the development of: i) a sense of changes in one's own and other's internal states that have occurred as a result of the onset of mental illness; ii) the selection of pertinent historical events related to the illness; and iii) and judgments about the causal links between historical events. Only on the basis of this, can the emergence of mental illness be understood and an adaptive response formulated and enacted. We suggest that it is here where deficits in social cognition and metacognition could prove to be profound barriers to insight. With deficits in social cognition and metacognition persons might be manifestly unable to grasp to the perspectives of others and hence have a limited or myopic view of what has happened since the onset of mental illness. They might thus, for instance, reject the possibility that they are ill because the knowledge that is plain in the mind of others, for example, changes others have observed in their mental states, is inaccessible to them. Social cognitive and metacognitive deficits might, therefore, directly block the ability to perceive and trust the view of others that treatment is needed. Beyond this, deficits in social cognition and metacognition might further limit persons' abilities to know how their own mental states have changed or are changing and to judge the impact of those changes on others. Thus, they might not know they are ill because they cannot see how profoundly different their own mental states are at present compared with experiences prior to the onset of mental illness. Indeed, without any

awareness of fluctuations in mental states, treatment might seem flatly unnecessary. Finally, deficits in metacognition and social cognition would likely have synergistically negative effects on insight. While deficits in social cognition might lead to incorrect assumptions about others, deficits in metacognition might lead to a lack of complex ideas about painful and confusing events. When these deficits are combined, it likely leads to a fragmented view, at best, of a life including experiences of mental illness.

To date, evidence supporting the link of insight with social cognition and metacognition have been found in several sources. For one, broad deficits in both social cognition and metacognition have been found in patients with schizophrenia and exist independent of global levels of psychopathology and neurocognition [87, 88]. Regarding insight, one study matched 58 individuals with prolonged schizophrenia with 56 matched controls on measures of Theory of Mind (ToM), neurocognition, and symptoms [74]. ToM impairments were shown to be significantly related to insight, independent of deficits in neurocognition or differing levels of symptom severity [74]. In another study, performance on tests of picture sequencing and joke appreciation were related to insight in 30 individuals with schizophrenia [91]. Quee and colleagues [53] showed that social cognition and neurocognition independently predicted insight in prolonged, but not first episode samples. The ability to recognize and appreciate the affective states of others [92], and perhaps even empathize with them [93], has also been linked to insight.

Regarding metacognition, it has been shown that individuals with prolonged schizophrenia that have poor metacognition also tend to have poorer insight, even when controlling for deficits in neurocognition [54]. In studies that controlled for neurocognition, an independent sample of individuals with schizophrenia demonstrated again that those with good insight also had higher levels of metacognition and social cognition [76, 94]. A similar pattern has been observed in individuals early in the course of schizophrenia, as their ability to recognize and respond to psychological and social challenges was shown to be predictive of clinical insight [30]. These findings are consistent with imaging studies that suggest insight is related to structure and function in brain areas or circuits thought to support processes necessary for metacognition, including self-consciousness, self-other distinction, and self-referential procession [95-99].

6. Paradoxical Distress and the Contribution of Stigma

Thus far, we have reviewed literature suggesting constructing a coherent account of psychiatric challenges can be complicated by symptoms and other deficits in schizophrenia spectrum disorders which may compromise the core processes which enable reflectivity including neurocognition, basic brain function, social cognition and metacognition. However, it is vital to consider findings that awareness of mental illness is not awareness of an emotionally neutral set of events. In fact, multiple studies have suggested that acceptance of mental illness is profoundly distressing and as such the distress that may ensue with awareness could be another complicating factor for the development of insight.

Improved insight has been linked to emotional distress and suicidality in both early and prolonged phases of the illness [20, 100, 101]. Paradoxically, with greater insight persons have been found to have higher levels of depression [102, 103, 48], lowered self-esteem [104], and decreased quality of life [105-107]. Exploration of these relationships has suggested that a range of factors influence whether insight causes distress including whether interventions are present [108] and a history of childhood trauma [109]. The view with the most research support is that the development of insight leads to distress when persons hold negative or stigmatizing beliefs about mental illness such as that having mental illness means that they are incompetent or dangerous [102]. In other words, insight may lead to emotional discomfort when it threatens an individual's previous sense of identity, his or her understanding of the world, or when it leads to awareness of concrete losses (in function or relationships) that were previously not apparent [110]. In support of this are findings that when individuals have higher levels of internalized stigma, improved insight has been linked to depression, lesser meaning in life, and demoralization [111-115]. In one recent example, Cavelti and colleagues [116] found that higher levels of insight at baseline were associated with an increase in self-stigma over a 12-month study period, leading to increased demoralization, and, ultimately, poorer functioning.

Additional support can be found in studies finding that patients who endorse stereotypes of mental illness are less likely to believe they have a mental illness [117]. Moreover, another study recently showed increased levels of poor insight are more common in cultures that are thought to have more stigmatizing beliefs about mental illness [118]. Concerning the influence of parental/caregiver insight on patient insight, patients with parents/caregivers who had less rejecting attitudes tended to have better insight [119]. Finally, structural equation modeling with 284 people with schizophrenia spectrum disorders supported the hypothesis that insight

diminishes hope and increases depression and self-stigma [120]. In this study, negative symptoms reduced hope and increased depression and self-stigma, while positive symptoms diminished self-stigma through a pathway via insight.

7. Emerging Interventions for Impaired Insight in Schizophrenia

To date, the majority of approaches that have attempted to address impaired insight involve the use of treatment models or strategies originally designed to address other aspects of schizophrenia. Such approaches include treatment modalities such as cognitive behavioral therapy, motivational interviewing, psychosocial education, and social skills training. In a meta-analytic review of the literature spanning from 1999 to 2012 Pijnenborg and colleagues [92], found that receiving treatment beyond usual care had a positive impact on insight, with psychoeducation and cognitive behavior therapy exerting marginal effects upon insight [92].

More recently, however, as the factors that lead to or sustain poor insight have been elucidated, treatments have been developed with multiple components, each targeting a potential cause of poor insight. An example of this is a study by Lalova et al [121] which found that three forms of cognitive remediation aimed at improving neurocognition, autobiographical memory, and metacognition led to improved awareness of symptoms, as well as overall insight. A second example of a multicomponent treatment was designed by Guo et al [122] and includes cognitive behavior therapy, family therapy, psychoeducation, and skills training [122]. In a clinical trial testing the effects of this intervention, it was shown that this combination of practices resulted in improvements in insight and treatment attitudes above and beyond a treatment as usual group. A third example of a promising integrated treatment approach currently under rigorous investigation is REFLEX [92]. REFLEX involves three modules, each consisting of four one-hour group sessions and dealing with factors that may promote insight. The modules target: 1) stigma; 2) developing a personal narrative; and 3) metacognition in the moment.

Consistent with work on the role of metacognition in general reflectivity and insight, there has also been increasing interest in metacognitive-oriented psychotherapies to promote insight [123-129]. Although there are similarities with REFLEX in that many of the same issues are addressed, metacognitive-oriented therapies more directly target metacognitive deficits. One promising program that targets discrete forms of metacognition and promotes insight has been developed and offered by Moritz [130]. This program, Metacognitive Training for Schizophrenia

Patients (MCT), was originally designed as an eight module group intervention, but has also been implemented individually. MCT aims to increase awareness of cognitive biases via targeting biases such as jumping to conclusions, attributional style, metamemory, biases against dis-confirmatory evidence, and deficits in theory of mind. MCT promotes metacognitive skills and therefore is thought to facilitate symptom reduction and reduce the probability of relapse [131-133]. In a recent preliminary report, evidence was presented for another targeted program of metacognitive training for individuals with schizophrenia [123]. This intervention involves an individual, single-module intervention that specifically targets cognitive biases thought to contribute to delusions and impaired insight. The investigators found that the intervention had a positive overall impact on delusions, but also significantly improved clinical insight. Metacognitive training has also been tested and shown to be effective for promoting awareness of symptoms in a French sample [134]. Another study recently showed the targeting metacognition could decrease cognitive biases and improve clinical insight [124]. To date, however, metacognitive training has yet been linked specifically to improved cognitive insight.

Another emerging metacognitively-oriented approach involves promoting insight across individual psychotherapy sessions. Metacognitive Reflection and Insight Therapy (MERIT) [135] is a manual-based model of psychotherapy designed for promoting the process of recovery in individuals with severe forms of mental illness. Of note, MERIT does not explicitly seek to improve insight. It instead seeks to enhance the reflective capacity necessary for persons to form the kinds of integrated narratives which could form the structure of insight. At its core, MERIT seeks to promote metacognitive capacity through joint reflection upon the patient's thoughts, hopes, wishes, memories and affective experiences. Interventions to stimulate metacognitive activity in MERIT are based on ongoing assessments of the patient's current level of metacognitive functioning. MERIT conceptualizes metacognitive capacities as hierarchical, such that before persons are able to perform more complex levels of metacognitive function they must be capable of engaging in less complex levels. Patients with lesser capacities thus naturally need interventions to assist them to master basic capacities before attempting more complex ones. As persons progress, however, it is expected that pain will emerge and metacognitive capacity may periodically be reduced and lower level metacognitive interventions may be necessary. In order to stimulate metacognition using MERIT, eight interrelated processes should occur within every session. These include positioning the patient's agenda as primary, sharing of the therapist's

thoughts without disrupting dialogue, eliciting a narrative episode(s), defining a psychological problem, discussing interpersonal processes in session, evaluating progress, stimulating reflective activities about the self and others, and finally, stimulating thoughts about how best to understand and to respond to psychological and social challenges [129]. Thus far, the evidence of feasibility of such approaches includes multiple case reports [125-129; 136-140] and a formal trial is currently underway [135].

8. Summary and Conclusions

Poor insight is not only a barrier to treatment engagement, but also a significant contributor to poor outcomes in individuals with schizophrenia spectrum disorders. However, insight has also been linked to emotional distress and increased stigma. Therefore, this review has offered an update from the literature regarding factors that significantly contribute to, and result from, impaired insight in schizophrenia. Specifically, an integrative model of poor insight has been proposed which stresses the role of impaired reflectivity in the development and maintenance of impaired insight with consideration of contributing factors such as symptoms, neurocognition deficits, social cognitive and metacognitive deficits, and social factors such as self-stigma. This model enables us to see how integrative therapeutic approaches that target reflectivity are needed which can address these factors as they are personally relevant for unique individuals in the spirit of the recovery movement. Further work is needed to assess the efficacy and implementation of novel, recovery-oriented approaches that emphasize increasing capacity for reflectivity and the impact these approaches may have on several outcomes, including insight.

9. Expert Commentary

The development of richer theoretical models of poor insight in schizophrenia have stressed that poor insight involves a relative failure to form a coherent and adaptive account of psychiatric challenges. This has led researchers to move beyond looking for the single cause of poor insight and instead to consider a range of biological, psychological and social factors whose interaction could hamper reflectivity and cause poor insight. As illustrated in Figure one, this work has suggested an integrative model of insight in which persons may be unaware that they

are ill as a result of: i) anomalous experiences (e.g. symptoms) which are difficult to make sense of, ii) neurocognitive deficits and related abnormalities in brain function which may impact persons abilities to access the kinds of information of which insight is composed, iii) metacognitive and iv) social cognitive deficits which may interfere with the integration of the information and v) stigma which may render the integration of that information inordinately painful and destructive.

Taken as a whole, this work first suggests a number of potential paths to insight and indeed informs us that insight, like all forms of human meaning making, involves inordinately complex processes which can be bolstered or hindered by different factors. As an illustration, consider a person with schizophrenia who denies he is ill and possesses a crystallized belief that others are out to harm him. The integrative model tells us that his lack of insight could be the result of many things. The statement: "I am not ill… people really do want to harm me" could be a reflection of an inability to find another explanation for a powerful sense of not being safe. It could additionally be a reflection of an inability to remember actual recent events or decide which ones are salient. It could be a result of an inability to perceive or think in a nuanced way about other people, or to reflect upon the connections between one's own thoughts and emotions. It might also be a way to avoid adopting a label which others erroneously equate with incompetence. Indeed, with so many factors at play the number of moderating and mediating relationships quickly grows and the number of potential factors may assist with explaining the host of contradictory findings by research which has historically considered only one set of factors at a time.

One potentially limiting feature of many earlier models of insight in schizophrenia is that they conceptualized individuals with poor insight as merely passive observers of their life and the challenges that emerged within it. These views positioned patients as beings who should be taught that they are ill. As further illustrated in Figure 1, the integrative model of insight highlights how insight is not something that persons passively receive or develop in isolation. The development of insight involves the active creation of personalized meaning, which is in line with the dimensions of recovery recently emphasized as essential in mental health treatment [141]. At its core, this model of insight calls upon a range of reflective processes which are necessarily intrapersonal as well as interpersonal and take into account not merely the presence

of symptoms, but the meaning-making necessary to understand oneself as a complex being in an interpersonal world.

This has far-reaching implications for the content of interventions and points to targets which take us well beyond the sphere of education. First, if we understand poor insight as a narrative phenomenon and acknowledge the importance of reflective processes, it is understandable that no single treatment modality thus far has demonstrated adequate effectiveness for improving insight in schizophrenia. Second, there are likely a range of formalized procedures needed to target the potential factors which sustain poor insight. Interventions could, for example, assist persons to decide how to think about anomalous experiences, or to recollect and sort through life events and decide which are the most salient. As is apparent in a number of new interventions, the most effective treatment might seek to help persons to piece life events together into coherent accounts of one's life, in a way that ultimately rejects stigma. Certainly, the evidence from emerging protocols cited above indicates that those procedures are acceptable to patients and can be delivered in an effective way.

Even beyond issues of content, however, the integrative model has even deeper implications for the processes involved in treatment. Specifically, the model points to the need to work with persons to think about issues rather than encourage them to believe certain things. In such interventions, patients would not be instructed to accept certain facts but instead engaged in the kind of dialogue that promotes meaning making. Although the treatments adhering to these principals are in the relatively early stages of testing, these novel interventions are also consistent with the principles of recovery, stressing that recovery is not just symptom remission or the attainment of psychosocial milestones, but requires feeling empowered as an active agent in one's own life.

10. Five Year View

There is a growing body of evidence to support the clinical utility of clarifying the influence of factors that contribute to insight. However, even with decades of research into such factors, a comprehensive understanding of poor insight in schizophrenia spectrum disorders remains elusive. Over the next five years, the field awaits development and testing of more inclusive models. Future research regarding insight will benefit from contemporary models that integrate the importance of reflective processes, such as awareness of changes in one's own and

other's internal states, recognition of pertinent historical events related to the illness, and judgment about the causal links between historical events and the synthesis of that information into a coherent representation and plan of action for dealing with such challenges [2, 80, 53, 137]. More specifically, there is a need for further investigation into how insight is influenced by self and other reflectivity in the contexts of social cognition and metacognition.

Research to date has also identified a number of other potential directions that should be further explored in order to promote understanding of impaired insight in schizophrenia spectrum disorders. First, larger and more inclusive cross-sectional studies are needed that examine influencing variables and explore directionality of established relationships. For instance, future studies should include domains such as psychopathology, cognition, metacognition and social cognition, stigma, trauma, self-esteem, hope, and personality. Second, longitudinal studies of insight over the course of schizophrenia and across the lifespan are needed. Such studies could elucidate how insight is influenced over time by associated variables. These types of studies could also address a number of important research questions about the stability of insight and its potential improvements, the nature of the associations among related factors as insight improves, and specifically how ongoing development of personal narratives impact insight. A third area of potential research on insight is furthering understanding of the multiple domains of illness awareness. While some studies have already begun to explore these questions [54], future studies should continue to involve additional goals such as clarifying potential shared and unique influences of variables such as symptoms, neurocognition, and metacognition upon the unique domains of clinical insight: awareness of illness, illness consequences, and need for treatment. This work would also need to be examined longitudinally to incorporate fuller understanding of variable influence and links to insight domains over time. A fourth area of potential research includes future investigations that serve to elucidate how brain structure and function impact insight, as investigations into this could be informative for developing both advances into etiological theory and novel therapeutic approaches. To date, imaging studies suggest that a number of areas and anomalies may subserve impaired insight, including reduced total brain volume, ventricular enlargement, frontal lobe atrophy, reduced frontal volume, gray matter deficits in the cingulate, precuneus, temporal and parietal lobes [68]. However, continued research is needed for replication as well as to clarify how these abnormalities fit together and manifest clinically as impaired insight. A fifth area of potential research involves the need for

continued innovation in treatment approaches. Unlike most currently available interventions, future development and investigation of emerging therapies should focus on incorporating reflective and narrative processes into therapy. Thus far, the evidence of feasibility of such approaches includes a number of case reports [138, 125-129] and a formal trial currently underway [135]. However, additional randomized control trials, over adequate periods of time (at least 6 months) and with larger and more diverse samples are needed. These studies should also incorporate ongoing assessment of a number of factors related to insight, including but not limited to psychopathology, neurocognition, metacognition, social cognition, and social factors. This data would enable clarification of how each of these domains may potentially impact illness awareness.

In sum, it is becoming increasingly necessary to better define the phenomenology of poor insight and integrate neurobiological and psychological findings as well as the social context as discussed in the present review. It seems that it will be particularly important to tease apart the influence of positive, negative, and perhaps others types of symptoms, upon insight. Moreover, there seems to be mounting evidence that looking at particular neurocognitive domains or specific combinations of such domains may be imperative to elucidating their influence upon insight. More clarification regarding the neuroanatomical and functional bases of insight is also needed. Specific areas that have been identified as relevant, such as frontocortical areas and the anterior cingulate, should be further explored. While we have pointed to the need for the study of specific areas, future meta-analyses are also needed. Finally, future research is needed to inform and test novel, more effective interventions for improving insight, and ultimately outcomes, in individuals living with schizophrenia.

11. Key Issues

- Impaired insight, or unawareness of illness, is a commonly observed feature of schizophrenia spectrum disorders.

- Impaired insight is a barrier to treatment and significantly contributes to poorer outcomes for individuals with schizophrenia. However, how this complex, multi-dimensional construct is developed and sustained remains incompletely understood.
- Contemporary models of insight suggest that a limited capacity for reflectivity, or a failure to construct an adaptive understanding of a complex series of events which result from mental illness, may be a direct or moderating antecedent of poor insight.
- Research suggested an integrative model of poor insight in which poor insight may develop in the face of the face of symptoms, neurocognition deficits, social cognitive and metacognitive deficits, and social factors such as self-stigma.
- A number of emerging, integrated approaches are being developed to better address the antecedents of poor insight in schizophrenia as illustrated by the integrated model of poor insight.

Declaration of interests

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* of interest
** of considerable interest

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Figure 1. An integrative model of poor insight in schizophrenia spectrum disorders. Each box represents a construct. Solid black arrows illustrate the relationships among constructs. Broken arrows represent potential mediating and moderating relationships.